IN THE CLAIMS

1-22. (Canceled)

23. (Previously Presented) A system, comprising:

an illuminator;

a phase shifting mask; and

a restrictor to restrict light from passing through a first region having a first perimeter and to pass light through a second region between the first perimeter and a second perimeter that surrounds the first perimeter, the restrictor to adjust illumination parameters associated with the first perimeter and the second perimeter to compensate for a phase shift error in the phase shifting mask.

24. (Previously Presented) The system of claim 23, wherein the restrictor provides off-axis illumination.

25. (Previously Presented) The system of claim 23, wherein the restrictor optimizes printing of the alternating phase shifting mask using empirical data taken from one or more simulations of an image on the alternating phase shifting mask.

26. (Previously Presented) The system of claim 23, wherein the phase shifting mask is selected from the group consisting of: an alternating phase shifting mask and an attenuating phase shifting mask.

27. (Previously Presented) A system, comprising:

an illuminator;

a phase shifting mask; and

a restrictor to provide off-axis illumination, the restrictor to restrict light from passing through a first region having a first perimeter and to pass light through a second region between the first perimeter and a second perimeter that surrounds the first perimeter, wherein parameters

associated with at least one of the first perimeter and the second perimeter are optimized to compensate for a phase shift error in the phase shifting mask.

28. (Previously Presented) The system of claim 27, wherein an image on the phase shifting mask is simulated using various parameters of the off-axis illumination, and wherein collected empirical data from simulations is used to optimize the off-axis illumination parameters.

29. (Previously Presented) A lithographic system, comprising:

an illuminator adapted for providing a source of light;

a restrictor to provide off-axis illumination, the restrictor to restrict light from passing through a first region having a first perimeter and to pass light through a second region between the first perimeter and a second perimeter that surrounds the first perimeter;

a phase shifting mask, wherein parameters associated with at least one of the first perimeter and the second perimeter are optimized to compensate for a phase error in the phase shifting mask; and

an optics lens for focusing light on a photoresist layer that overlies a conductive layer on a substrate.

30. (Previously Presented) The lithographic system of claim 29, wherein the restrictor is a ring having an inner radius and an outer radius, and wherein light is not passed within the inner radius.

31. (Previously Presented) The lithographic system of claim 29, wherein the phase shifting mask is selected from the group consisting of: an alternating phase shifting mask and an attenuating phase shifting mask.

32. (Previously Presented) A system, comprising:

a phase shifting mask having a phase shift error;

an illuminator configured for off-axis illumination, the illuminator being configured to restrict light from passing through a first region having a first perimeter and to pass light through

a second region between the first perimeter and a second perimeter that surrounds the first perimeter;

wherein a number of off-axis illumination parameters associated with at least one of the first perimeter and the second perimeter are optimized to compensate for the effects of the phase shift error;

wherein the illuminator uses empirical data in optimizing the off-axis illumination parameters; and

wherein the empirical data is taken from one or more simulations of an image on the attenuating phase shifting mask.

33. (Previously Presented) The system of claim 32, wherein the phase shifting mask is selected from the group consisting of: an alternating phase shifting mask and an attenuating phase shifting mask.

34. (Previously Presented) A system, comprising:

a phase shifting mask having a phase shift error;

an illuminator configured for off-axis illumination wherein the off-axis illumination parameters are optimized to compensate for the effects of the phase error; and

a ring located between the phase shifting mask and the illuminator, wherein the ring has an inner radius and an outer radius, and wherein light passes inside the outer radius and outside the inner radius of the ring to the phase shifting mask.

35. (Previously Presented) The system of claim 34, wherein the phase shifting mask is selected from the group consisting of: an alternating phase shifting mask and an attenuating phase shifting mask.

36. (Previously Presented) An illuminator for a lithographic system, comprising:

a light source for providing light; and

a restrictor for providing off-axis illumination, the restrictor to restrict light from passing through a first region having a first perimeter and to pass light through a second region between

the first perimeter and a second perimeter that surrounds the first perimeter, wherein the restrictor provides means for optimizing parameters associated with at least one of the first parameter and the second parameter to compensate for a phase error in a phase shifting mask.

37. (Previously Presented) The illuminator of claim 36, wherein the restrictor is a ring having an inner radius and an outer radius, and wherein light is not passed within the inner radius.

38. (Previously Presented) The illuminator of claim 36, wherein the phase shifting mask is selected from the group consisting of: an alternating phase shifting mask and an attenuating phase shifting mask.

39. (Currently Amended) An illuminator, comprising:

a light source for providing light; and

a restrictor to restrict light from passing through a first region having a first perimeter and to pass light through a second region between the first perimeter and a second perimeter that surrounds the first perimeter, wherein the restrictor provides means for optimizing printing of a phase shifting mask to compensate for a phase shift error in the phase shifting mask.

40. (Currently Amended) A method, comprising:

providing a phase shifting mask;

providing off-axis illumination, including restricting light from passing through a first region having a first perimeter and passing light through a second region between the first perimeter and a second perimeter that surrounds the first perimeter;

simulating an image on the phase shifting mask; and

adjusting parameters of the off-axis illumination, including adjusting parameters associated with at least one of the first perimeter and the second perimeter to compensate for a phase shift error in the phase shifting mask.

41. (Previously Presented) The method of claim 40, further comprising collecting empirical data from one or more image simulations.

42. (Previously Presented) The method of claim 40, wherein the phase shifting mask is selected from the group consisting of: an alternating phase shifting mask and an attenuating phase shifting mask.

43. (Previously Presented) A method of optimizing printing of a phase shifting mask having a phase error, the method comprising:

configuring an illuminator for off-axis illumination;

performing one or more simulations of an image on the phase shifting mask, including:

varying a depth of focus of the image on the phase shifting mask, wherein varying the depth of focus includes changing an inner radius of a ring and changing an outer radius of the ring, the ring located between the illuminator and the phase shifting mask, such that a light source from the illuminator passes inside the outer radius and outside the inner radius of the ring to the phase shifting mask; and

varying sigma in and sigma out parameters corresponding to the illuminator; and

adjusting off-axis illumination parameters based upon the one or more simulations.

44. (Previously Presented) The method of claim 43, wherein the phase shifting mask is selected from the group consisting of: an alternating phase shifting mask and an attenuating phase shifting mask.

45. (Currently Amended) A method of optimizing printing of a phase shifting mask having a phase error, the method comprising:

providing the phase shifting mask having [[a]] <u>the</u> phase shift error;

providing off-axis illumination;

performing one or more simulations on an image of the phase shifting mask, including varying a depth of focus of the image on the phase shifting mask and including varying sigma in and sigma out parameters <u>to compensate for the phase shift error of the phase shifting mask</u>; and

providing a means for controlling the light source to optimize printing of the phase shifting mask based upon the one or more simulations.

46. (Previously Presented) The method of claim 46, wherein the phase shifting mask is selected from the group consisting of: an alternating phase shifting mask and an attenuating phase shifting mask.

47. (Previously Presented) A method of printing an image from a phase shifting mask at two different wavelengths, the method comprising:

providing the phase shifting mask;

providing an I-line light source at a first wavelength;

printing the image on the phase shifting mask;

providing a deep ultra-violet (UV) light source at a second wavelength;

configuring the UV light source for off-axis illumination;

performing one or more simulations of the image on the phase shifting mask, including:

varying a depth of focus of the image on the phase shifting mask; and

varying sigma in and sigma out parameters;

adjusting off-axis illumination parameters based upon the one or more simulations; and

printing the image on the phase shifting mask.

48. (Previously Presented) The method of claim 47, wherein the phase shifting mask is selected from the group consisting of: an alternating phase shifting mask and an attenuating phase shifting mask.

49. (Previously Presented) A method of printing an image from a phase shifting mask using an illuminator operating at a different wavelength from what the mask was initially designed for, the method comprising:

providing the phase shifting mask;

providing the illuminator having a light source;

configuring the illuminator for off-axis illumination;

performing one or more simulations of the image on the phase shifting mask, including:

varying a depth of focus of the image on the phase shifting mask; and

varying sigma in and sigma out parameters corresponding to the illuminator;

adjusting off-axis illumination parameters based upon the one or more simulations; and

printing the image on the phase shifting mask.

50. (Previously Presented) The method of claim 49, wherein the phase shifting mask is selected from the group consisting of: an alternating phase shifting mask and an attenuating phase shifting mask.

51. (Currently Amended) A method of compensating for a phase error in a phase shifting mask, comprising:

providing off-axis illumination, including restricting light from passing through a first region having a first perimeter and passing light through a second region between the first perimeter and a second perimeter that surrounds the first perimeter;

simulating an image on the phase shifting mask; and

adjusting parameters for the off-axis illumination based upon one or more image simulations to compensate for the phase error in the phase shifting mask.

52. (Previously Presented) The method of claim 51, wherein providing off-axis illumination includes providing:

a light source; and

a restrictor ring for controlling the light source.

53. (Previously Presented) The method of claim 51, wherein providing off-axis illumination includes providing:

a light source; and

a restrictor sigma in and a restrictor sigma out for controlling the light source.

54. (Previously Presented) The method of claim 51, wherein providing off-axis illumination includes providing:

an illuminator; and

an adjustment on the illuminator for controlling the light source.

55. (Previously Presented) The method of claim 51, wherein simulating an image includes:

varying a depth of focus of the image on the phase shifting mask; and

varying sigma in and sigma out parameters.

56. (Previously Presented) The method of claim 51, wherein the phase shifting mask is selected from the group consisting of: an alternating phase shifting mask and an attenuating phase shifting mask.

57. (Previously Presented) A system, comprising:

an illuminator;

a restrictor adjustment on the illuminator to adjust off-axis illumination by adjusting at least one parameter associated with at least one of a first perimeter and a second perimeter that surrounds the first perimeter, wherein the restrictor adjustment varies light from the illuminator with respect to an optical axis, and restricts light from passing through a first region defined by the first perimeter and passes light through a second region between the first perimeter and the second perimeter; and

a phase shifting mask, wherein the restrictor adjustment on the illuminator compensates for a phase shift error in the phase shifting mask.

58. (Previously Presented) The system of claim 57, wherein the phase shifting mask is selected from the group consisting of: an alternating phase shifting mask and an attenuating phase shifting mask.

59. (Previously Presented) A system, comprising:

an illuminator;

a restrictor ring for varying light from the illuminator with respect to an optical axis; and

a phase shifting mask, wherein the restrictor ring compensates for a phase shift error in the phase shifting mask.

60. (Previously Presented) The system of claim 59, wherein the phase shifting mask is selected from the group consisting of: an alternating phase shifting mask and an attenuating phase shifting mask.

61. (Previously Presented) A system, comprising:

an illuminator;

a restrictor sigma in and a restrictor sigma out for varying light from the illuminator with respect to an optical axis; and

a phase shifting mask, wherein the restrictor sigma in and the restrictor sigma out compensates for a phase shift error in the phase shifting mask.

62. (Previously Presented) The system of claim 61, wherein the phase shifting mask is selected from the group consisting of: an alternating phase shifting mask and an attenuating phase shifting mask.

63. (Previously Presented) A lithographic system, comprising:

an illuminator adapted for providing a source of light;

a restrictor adapted to provide off-axis illumination, the restrictor including a ring having an inner radius and an outer radius, wherein light is not passed within the inner radius;

a phase shifting mask, wherein parameters of the off-axis illumination are optimized to compensate for a phase error in the phase shifting mask; and

an optics lens for focusing light on a photoresist layer that overlies a conductive layer on a substrate.

64. (Previously Presented) An illuminator for a lithographic system, comprising:

a light source for providing light; and

a restrictor for providing off-axis illumination, the restrictor including a ring having an inner radius and an outer radius, wherein light is not passed within the inner radius, wherein the restrictor provides means for optimizing parameters of the off-axis illumination to compensate for a phase error in a phase shifting mask.

65. (Currently Amended) A method of compensating for a phase error in a phase shifting mask, comprising:

providing off-axis illumination, including providing a light source and a restrictor ring for controlling the light source;

simulating an image on the phase shifting mask; and

adjusting parameters for the off-axis illumination based upon one or more image simulations to compensate for the phase error in the phase shifting mask.

66. (Currently Amended) A method of compensating for a phase error in a phase shifting mask, comprising:

providing off-axis illumination, including providing a light source and a restrictor sigma in and a restrictor sigma out for controlling the light source;

simulating an image on the phase shifting mask; and

adjusting parameters for the off-axis illumination based upon one or more image simulations to compensate for the phase error in the phase shifting mask.

67. (Currently Amended) A method of compensating for a phase error in a phase shifting mask, comprising:

providing off-axis illumination;

simulating an image on the phase shifting mask, including varying a depth of focus of the image on the phase shifting mask and varying sigma in and sigma out parameters; and

adjusting parameters for the off-axis illumination based upon one or more image simulations to compensate for the phase error in the phase shifting mask.